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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,834	04/21/2004	Ravi Chandran	MTC-44	5317
22827	7590	01/25/2005	EXAMINER	
DORITY & MANNING, P.A. POST OFFICE BOX 1449 GREENVILLE, SC 29602-1449			STRICKLAND, JONAS N	
			ART UNIT	PAPER NUMBER

1754

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/828,834	Applicant(s) CHANDRAN ET AL.	
	Examiner Jonas N. Strickland	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 6-8, 11, 12, 16-19, and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mason (US Patent 6,280,694 B1).

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Applicant claims a waste stream treatment method comprising: feeding a waste stream comprising nitrates, nitrites, or mixtures thereof to a reactor; heating the reactor to a reaction temperature; feeding a carbon-containing additive to the reactor; decomposing the carbon-containing additive to form a carbon-containing radical; and reducing the nitrates, nitrites, or mixtures thereof via reaction with the carbon-containing radical to a product stream, wherein the product stream comprises nitrogen gas, carbonate salts, and at least one of carbon monoxide and carbon dioxide.

Mason discloses a system and method having a single reaction vessel using superheated steam augmented by oxygen for reducing nitrogen oxides present in a wide variety of organic compounds (see abstract). Nitrate compounds or wastes are fed into a single vessel along with a fluidized gas composed of steam and oxygen (col. 2, lines 8-12). Mason continues to disclose wherein carbonous materials are added and heat is produced in the reactor. The nitrates are reduced and nitrogen gas, and carbon monoxide, as well as carbon dioxide are produced (col. 2, lines 17-34). Mason also makes reference to the production of sodium salts that are collected at the bottom of the reaction vessel (col. 4, lines 37-44). Since, Mason teaches feeding a waste comprised of nitrates and feeding a carbon-containing additive, which reduces the nitrates and produces a nitrogen gas, and at least one of carbon monoxide and carbon dioxide, it would have been obvious to one of ordinary skill in the art to expect the process of Mason to also have been able to produce carbonate salts, since Mason also teaches reducing nitrates with a carbon additive, which produces a nitrogen gas, and at least

one of carbon monoxide and carbon dioxide, and a sodium salt. Furthermore, Mason discloses wherein sodium nitrate is a known waste product (col. 1, lines 50-57).

The reaction vessel operates at 600-800 Deg. C (col. 4, lines 17-20). With respect to claim 7, Mason discloses the use of electrical heaters, which may supply indirect heat (col. 2, line 40). Mason continues to disclose the need to reduce radioactive wastes (col. 1, lines 50-57). With respect to claim 17, Mason discloses wherein carbon dioxide may be used as a fluidizing stream (col. 2, lines 20-23). With respect to claim 18, Mason discloses wherein other fluidizing gases may be used such as hydrogen (col. 3, lines 3-5).

With respect to claim 27, it would have been obvious to one of ordinary skill in the art to achieve the amount of oxygen comprising less than about 5%, since this may read on zero.

5. Claims 4, 5, 13-15, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mason (US Patent 6,280,694 B1) as applied to claims 1-3, 6-8, 11, 12, 16-19, and 22-27 above, and further in view of Muramatsu et al. (US Patent 5,747,410).

Applicant claims with respect to claims 4, 5, 13-15, 20 and 21, wherein the carbon-containing additive is isopropyl alcohol or polypropylene.

The teachings of Mason have been discussed with respect to claims 1-3, 6-8, 11, 12, 16-19, and 22-27. Mason discloses wherein carbon additives are useful for reducing nitrates and nitrogen oxides in waste streams. Mason discloses wherein the fluidized stream (steam), the reductants, and waste stream are injected into a reaction

vessel (see claim 1). However, Mason is silent in regards to wherein the carbon-containing additive is isopropyl alcohol or polypropylene.

Murumatsu et al. teaches wherein a carbon-containing additive, such as isopropyl alcohol and polypropylene may be used as reducing agents in treating exhaust gases, which contain nitrogen oxides (col. 11, line 42 – col. 12, line 24).

Murumatsu et al. continues to teach wherein the additive is a gas (col. 11, lines 56-58).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Mason, based on the teachings of Murumatsu et al., by adding a carbon additive, such as isopropyl alcohol or polypropylene to a waste stream, because Murumatsu et al. teaches wherein adding isopropyl alcohol or polypropylene is effective for reducing nitrogen oxides in waste gas streams. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill would have expected a process for treating waste gases wherein a carbon-containing additive is used as a reductant as taught by Murumatsu et al. to be similarly useful and applicable to a process for treating waste gases wherein a carbon-containing additive is used as a reductant as taught by Mason.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mason (US Patent 6,280,694 B1) as applied to claims 1-3, 6-8, 11, 12, 16-19, and 22-27 above, and further in view of Itoyama et al. (US Patent 5,918,582).

Applicant claims with respect to claim 9, wherein the reactor is operated at negative gauge pressure. The teachings of Mason have been discussed with respect to

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claims 1-3, 6-8, 11, 12, 16-19, and 22-27. However, Mason does not teach wherein a negative gauge pressure is used with the reactor.

Itoyama et al. teaches using a system for treating nitrogen containing waste gases wherein a negative gauge pressure is used for the reactor.

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Mason by using a reactor comprised of a negative gauge pressure, since Itoyama et al. teaches using a system for treating nitrogen containing waste gases wherein a negative gauge pressure is used for the reactor. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art, would have expected a process for treating waste gases comprised of nitrogen as taught by Itoyama et al. to be similarly useful and applicable for a process for treating waste streams comprised of nitrogen as taught by Mason.

7 Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mason (US Patent 6,280,694 B1) as applied to claims 1-3, 6-8, 11, 12, 16-19, and 22-27 above, and further in view of Hepburn et al. (US Patent 6,813,882 B2).

Applicant claims with respect to claim 10, wherein the waste stream further comprises sulfur-containing compounds, the method further comprising reduction of the sulfur-containing compounds.

The teachings of Mason have been discussed with respect to claims 1-3, 6-8, 11, 12, 16-19, and 22-27. However, Mason is silent in regards to reducing sulfur-containing compounds.

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Hepburn et al. teaches wherein hydrocarbons are used as reductants for treating a waste stream comprised of nitrates and sulfur-containing compounds (see entire patent and claims 1 and 9).


Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Mason, based on the teachings of Hepburn et al., by reducing sulfur-containing compounds in a waste stream comprised of nitrates with a carbon-containing additive, because Hepburn et al. teaches wherein hydrocarbons are used as reductants for treating a waste stream comprised of nitrates and sulfur-containing compounds. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art, would have expected a process for treating a waste stream wherein the waste stream is comprised of nitrates and is treated with a carbon-containing additive to be similarly useful and applicable to a process for reducing nitrates in a waste stream comprised of a carbon-containing additive as taught by Mason.

Conclusion

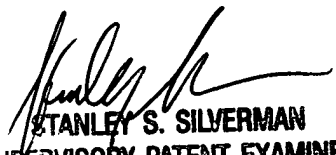
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonas N. Strickland whose telephone number is 571-272-1359. The examiner can normally be reached on M-TH, 7:30-5:00, off 1st Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonas N. Strickland
January 19, 2005



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